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EXAMINER	
RUDE, TIMOTHY L	
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2871	
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05/27/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/015,701	KIM, KYEONG JIN	
	Examiner	Art Unit	
	TIMOTHY RUDE	2871	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,4-9,12-19 and 21-28* is/are pending in the application.

4a) Of the above claim(s) *6,8,16 and 21-28* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1,4,5,7,9,12-15 and 17-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 28 April 2009 has been entered.

Claims

Claim 1 is amended. Claims 2 and 20 are canceled by Applicant.

Specification

The disclosure is objected to because of the following informalities:

Applicant's disclosed method in the Specification at pages 10 and 11 [0050] and [0051] is unclear. It is not clear what is being disclosed by "The hardening of the sealant is completed by exposure to UV ray preferably under no pressure.". It is also not clear when this step is performed. Applicant's "under no pressure" can be considered under no *added* pressure, i.e., at ambient (atmospheric) pressure, at no *differential* pressure, or at a perfect vacuum. Applicant may be able to clarify this

without the addition of new matter depending upon Applicant's priority document(s) and availability of example prior-art.

For examination purposes the specification and the corresponding new limitations in claim 1 will be considered to mean hardening prior to removal from the vacuum.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1, 4, 5, 7, 9, and 11-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh et al (Oh) USPAT 6,130,729 in view of Liu et al (Liu) USPAT 6,573,965 B1, Von Gutfeld et al (Von Gutfeld) USPAT 6,055,035, Kishimoto et al (Kishimoto) USPAT 6,515,718 B1, Takeda et al (Takeda) USPAT 7,224,421 B1, Lien USPAT 5,907,380, Abe USPAT 5,511,591, and further in view of Sasaki USPGPUB 2001/0004281.

As to claims 1, 7, and 11, Ohe discloses (Abstract and entire patent) a method of forming a liquid crystal display device comprising: forming an L-shaped thin film transistor (Figure 3A, col. 6, lines 32-37) and a pixel electrode, 39, on a first substrate.

FIG. 3A

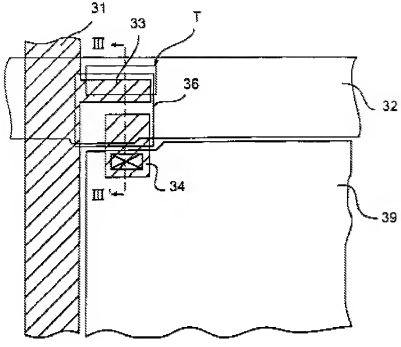
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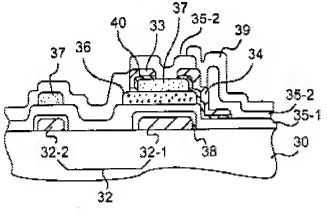
FIG. 3B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Ohe does not explicitly disclose forming a dielectric frame having a first height and a sealant having a second height on a second substrate, the first height of the dielectric frame being different from the second height of the sealant; dispensing liquid crystal on the first substrate; and attaching the first and second substrates to each other.

Liu teaches (Abstract and entire patent) forming bumps, 311 and 409 (Applicant's dielectric frame) on both substrates (Figure 5, col. 5, lines 45-57, and col. 5, lines 35-44) having a first height and a sealant having a second height (not shown) such that the sealant is taller than the dielectric frame as is evidenced by the gap between the dielectric frames and the opposed substrate (Figure 5) to comprise a multi-domain display with wide viewing angle (col. 2, lines 36-46).

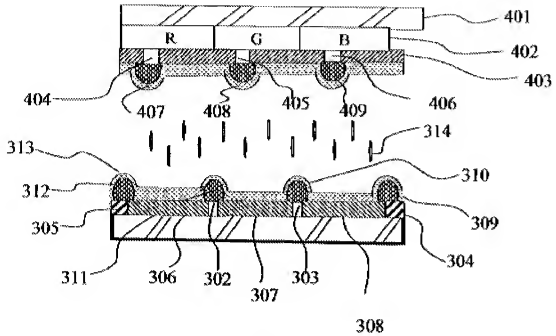


FIG. 5

Von Gutfeld teaches uniformly dispensing liquid crystal on discrete areas (pixel areas and non-pixel/non-display areas) of the first substrate (Abstract and entire patent); and attaching the first and second substrates to each other to provide a simplified and more efficient method for filling an unassembled LCD panel that is less costly (col. 2, lines 25-34) and Von Gutfeld, teaches that the sealant includes a material hardened by ultraviolet ray (col. 4, lines 1-4).

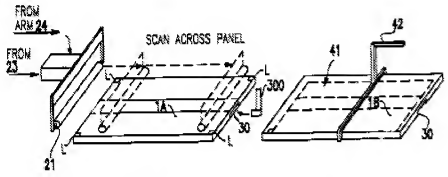


FIG.3 FIG.4

Liu is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add a dielectric frame on both substrates having a first height and a sealant having a second height such that the sealant is taller than the dielectric frame to comprise a multi-domain display with wide viewing angle.

Von Gutfeld is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to dispense liquid crystal on the first substrate; and attach the first and second substrates to each other to provide a simplified and more efficient method for filling an unassembled LCD panel that is less costly.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Oh with the dielectric frame on both substrates having a first height and a sealant having a second height such that the sealant is taller than the dielectric frame of Liu to comprise a multi-domain display with wide viewing angle and to dispense liquid crystal on the first

substrate; and attach the first and second substrates to each other per Von Gutfeld to provide a simplified and more efficient method for filling an unassembled LCD panel that is less costly.

Oh, Liu, and Von Gutfeld do not explicitly disclose specific heights of dielectric structures with respect to seal heights wherein a height difference between the sealant and the dielectric frame is more than 1 μm or wherein the first height is a range of 1-2 μm and the second height is in a range of 5-8 μm.

Please note the motivations for establishing cell gap (and correspondingly seal height) were well known in the art at the time the claimed invention was made and include optimization of voltage required, retarder value of liquid crystal layer, and control of liquid crystal mode or configuration.

Kishimoto discloses the motivation to optimize the height of a dielectric structure is to account for the relative dielectric constants of the respective components (col. 18, lines 21-23). In other words, the height is made sufficient to achieve the desired dielectric effect given the relative dielectric strength of the material used.

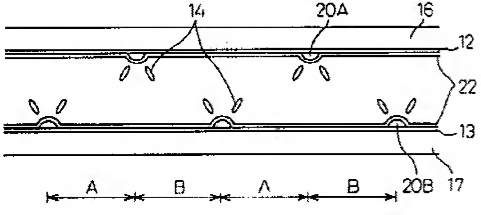
Kishimoto is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to optimize the results effective variables of relative dielectric frame height and seal height to achieve the desired dielectric effect given the relative dielectric strength of the material used.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Oh, Liu, and Von

Gutfeld with the specific heights of dielectric structures with respect to seal heights wherein a height difference between the sealant and the dielectric frame is more than 1 μm or wherein the first height is a range of 1-2 μm and the second height is in a range of 5-8 μm of Kishimoto to achieve the desired dielectric effect given the relative dielectric strength of the material used (MPEP 2144.05, II, B).

Takeda teaches numerous embodiments, at least one of which uses of 1.5 μm protrusions [Applicant's dielectric frames] in a cell with thickness 3.5 μm [col. 24, line 32 through col. 25, line 5] in order to achieve good mulit-domain performance with fast switching [enough dielectric frame hight for good muli-domain performance for good viewing angle performance plus enough sealant height (obviously needed) to bridge the 3.5 μm gap to allow unobstructed liquid crystal movement for fast switching speed].

Fig.100A



Takeda is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to optimize the results effective variables of

relative dielectric frame height and seal height to achieve the desired dielectric effect given the relative dielectric strength of the material used.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Oh, Liu, Von Gutfeld and with the specific heights of dielectric structures with respect to seal heights wherein a height difference between the sealant and the dielectric frame is more than 1 μm or wherein the first height is a range of 1.5 μm and the second height is in a range of greater than 3.5 μm of Takeda to achieve the desired dielectric effect given the relative dielectric strength of the material used (MPEP 2144.05, II, B) and fast switching.

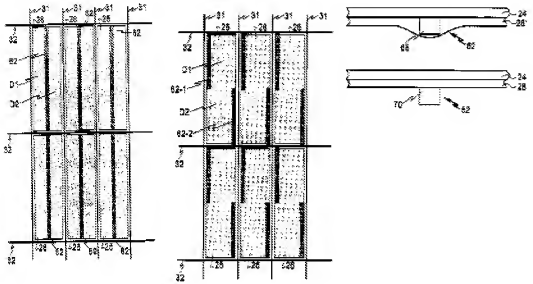
Please note that limitations of: "... the height difference between the sealant structure and dielectric frame allows the dispensed liquid crystal to be uniformly distributed on the first substrate." and "dispensing liquid crystal on the first substrate where the dielectric frame is not formed, wherein the dispensed liquid crystal moves and is uniformly distributed on the first substrate;" are considered met by the prior art as applied.

The height difference between the sealant structure and dielectric frame allows the dispensed liquid crystal to be uniformly distributed on the first substrate, since the liquid crystal is liquid and it does ultimately move to become a uniform layer between to substantially parallel substrates [inherently required to comprise a functional LCD]. Please also note that Applicant's specification does not support the specific step of movement of the liquid crystal subsequent to dispensing and prior to mating the

substrates, although one of ordinary skill in the art would realize that a liquid will inherently flow to at least some extent due to gravity. Examiner considered specification [0052] and [0056], but must rely on ordinary skill in the art to glean movement of the liquid crystal subsequent to dispensing and prior to mating the substrates.

As to limitations of "the first height of the dielectric frame is such that the dielectric frame provides a sufficient electric field distortion for a multi-domain effect." are considered met in view of the teachings as to creating a multi-domain effect, above.

Lien teaches the use of 'XP-9595' Photoimageable LCD Top Coat, which contains an acrylic copolymer [Applicant's photoacrylate], available from Shipley Co. of Marlborough, Massachusetts [col. 5, lines 40-64] as an art recognized material suitable for the same purpose of forming dielectric structures in LCDs that produce multi-domain effects [MPEP 2144.07].



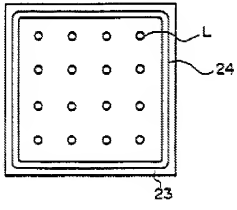
Lien is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add dielectric frames made of 'XP-9595' Photoimageable LCD Top Coat, which contains an acrylic copolymer [Applicant's photoacrylate], available from Shipley Co. of Marlborough, Massachusetts [col. 5, lines 40-64] as an art recognized material suitable for the same purpose of forming dielectric structures in LCDs that produce multi-domain effects [MPEP 2144.07].

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention of Oh with the dielectric frames made of 'XP-9595' Photoimageable LCD Top Coat, which contains an acrylic copolymer [Applicant's photoacrylate], available from Shipley Co. of Marlborough, Massachusetts [col. 5, lines 40-64] as an art recognized material suitable for the same purpose of forming dielectric structures in LCDs that produce multi-domain effects [MPEP 2144.07].

Please note Applicant's limitation as to "prevent the generation of bubbles in the liquid crystal" is considered an intended use limitation that adds little to the method step limitations. Clearly most all LCDs must be bubble free to work properly, so clearly it is obvious to one of ordinary skill to use sufficient seal height to prevent introduction of air bubbles into the LCD.

As to newly added limitations regarding a plurality of droplets, Abe teaches the use of a plurality of droplets, L, as a means of greatly improving productivity by reducing the amount of time required for liquid crystal fill [col. 8, line 37 through col. 9, line 22].

FIG. 9



Abe is evidence that workers of ordinary skill in the art would find the reason, suggestion, or motivation to add the step of dispensing a plurality of droplets spaced with each other to greatly improve productivity.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the invention with a plurality of droplets spaced with each other of Abe to greatly improve productivity. This method step is also

rendered obvious as an art recognized means suitable for the intended purpose of depositing liquid crystal material [MPEP 2144.07].

As to limitations regarding a plurality of droplets and heights that do not hinder the dispersed liquid crystal from being moved and uniformly distributed, examiner considers these limitations are met by the prior art as applied (and by most any known LCD method of manufacture) since the liquid crystal is liquid and it does ultimately move to become a uniform layer between to substantially parallel substrates [inherently required to comprise a functional LCD], and the resulting liquid crystal layer covers where the dielectric frame is not formed; it is not reasonable to consider application of liquid crystal material only on the areas where the dielectric frames are not formed without any liquid crystal getting on the dielectric frames because a droplet of liquid crystal is well known to be larger than a sub-pixel [not enabled]. Also, it is not at all clear [not at all enabled] how the height of the sealant around the perimeter has anything at all to do with movement of the liquid crystal subsequent to dispensing and prior to mating the substrates. The height difference seems only relevant to liquid crystal movement during completed LCD operation, e.g., switching, and that is not at all relevant to liquid crystal distribution during a method of making a display device.

Please again note that Applicant's specification does not support the specific step of movement of the liquid crystal subsequent to dispensing and prior to mating the substrates. Examiner considered specification [0052] and [0056], but must rely on ordinary skill in the art to glean movement of the liquid crystal subsequent to dispensing and prior to mating the substrates.

Regarding limitations wherein the second height of the sealant structure is proportional to the first height of the dielectric frame, this is considered met because the second height, SH, will inherently be SH/FH * FH, which is proportional.

The above do not explicitly teach completely hardening the sealant structure under no pressure.

Sasaki teaches the use of multiple sealants whereby one may harden one sealant in the vacuum and harden the second sealant after removal of the vacuum (i.e., after restoration to atmospheric pressure) in order to better control cell gap [0090] to [0093].

Sasaki is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to cure a sealant under no pressure to better control cell gap [0090] to [0093].

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the method with the step of curing a sealant under no pressure to better control cell gap [0090] to [0093].

As to claim 4 Liu, as combined above, teaches a method further comprising forming electric field inducing slits, 302 and 303 (Applicant's windows), in the pixel electrode, 306~308.

As to claim 5, Liu, as combined above, teaches in Figure 2 a method wherein the electric field inducing window has a slit shape.

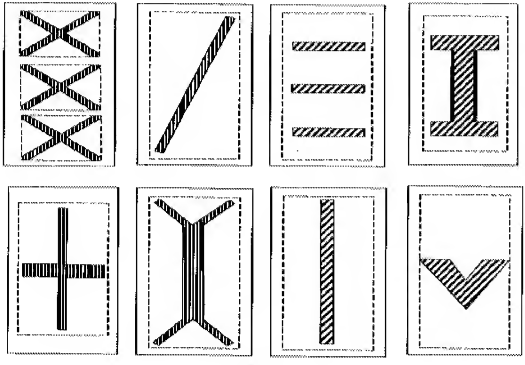


FIG. 2

As to claim 9, Liu, as combined above, teaches Prior Art in Figure 1 that shows dielectric frames drive the liquid crystal in various directions.

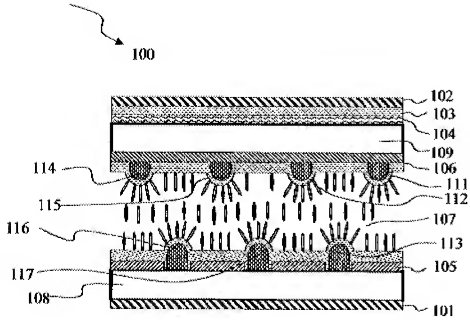


FIG. 1 (Prior Art)

As to claim 12, Oh, as combined above, discloses a method further comprising forming a common electrode on the second substrate (required element, not shown).

As to claim 13, Liu, as combined above, teaches a method wherein the dielectric frame, 409, is formed on the common electrode, 403 (Figure 5).

As to claim 14, Liu, as combined above, teaches a method further comprising forming an alignment layer, 313 and 407, on the first and second substrates (Figure 5).

2. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Oh, Liu, Von Gutfeld, Kishimoto, Takeda, Lien, Abe, and Sasaki, as applied to claims above, in view of Tanaka et al (Tanaka) USPAT 6,603,528 B1.

As to claim 15, Oh, Liu, and Von Gutfeld disclose the method of claim 14.

Oh, Liu, and Von Gutfeld do not explicitly disclose a method wherein the alignment layer is selected from the group consisting of polyimide, polyamide, polyvinyl alcohol, polyamic acid, and silicon oxide.

Tanaka teaches the use of polyimide as an art recognized material suitable for the intended purpose of forming an alignment film for liquid crystal displays (col. 9, lines 5-21).

Tanaka is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to use polyimide as an art recognized material suitable for the intended purpose of forming an alignment film for liquid crystal displays.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Oh, Liu, and Von Gutfeld with the polyimide alignment layer of Tanaka as an art recognized material suitable for the intended purpose of forming an alignment film for liquid crystal displays (MPEP 2144.07).

3. Claims 17-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Oh, Liu, Von Gutfeld, Kishimoto, Takeda, Lien, Abe, and Sasaki, as applied to claims above, in view of Kim et al (Kim) USPAT 6,100,953.

As to claims 17-19, Oh, Liu, and Von Gutfeld disclose the method of claim 14.

Oh, Liu, and Von Gutfeld do not explicitly disclose a method comprising formation of a phase difference film, negative uniaxial, or negative biaxial.

Kim teaches the use of negative uniaxial and negative biaxial phase compensation films (Applicant's phase difference films) as suitable means of improving viewing angle performance (col. 5, line 66, through col. 6, line 12).

Kim is evidence that ordinary workers in the art of liquid crystals would find the reason, suggestion, or motivation to add negative uniaxial and negative biaxial phase difference films as suitable means of improving viewing angle performance.

Therefore, it would have been obvious to one having ordinary skill in the art of liquid crystals at the time the invention was made to modify the LCD of Oh, Liu, and Von Gutfeld with the negative uniaxial and negative biaxial phase difference films of Kim as suitable means of improving viewing angle performance.

Response to Arguments

Applicant's arguments filed on 28 April 2009 have been fully considered but they are not persuasive.

Applicant's ONLY substantive arguments are as follows:

(1) Independent claim 1 is amended to overcome prior rejection(s).

(2) Dependent claims are allowable because they directly or indirectly depend from an allowable base claim.

Examiner's responses to Applicant's ONLY arguments are as follows:

(1) It is respectfully pointed out that Sasaki is applied to reject newly added limitations.

(2) It is respectfully pointed out that in so far as Applicant has not argued rejection(s) of the limitations of dependent claim(s), Applicant has acquiesced said rejection(s).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TIMOTHY RUDE whose telephone number is (571)272-2301. The examiner can normally be reached on Increased Flex Time Program.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nelms C. David can be reached on (571) 272-1787. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/TIMOTHY RUDE/
Primary Examiner, Art Unit 2871